Complete Summary

GUIDELINE TITLE

Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee.

BIBLIOGRAPHIC SOURCE(S)

Institute for Clinical Systems Improvement (ICSI). Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2003 Nov. 43 p. [40 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Adult degenerative joint disease (DJD) of the knee

GUIDELINE CATEGORY

Diagnosis
Evaluation
Treatment

CLINICAL SPECIALTY

Family Practice
Internal Medicine
Orthopedic Surgery
Physical Medicine and Rehabilitation
Rheumatology

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Health Plans
Hospitals
Managed Care Organizations
Nurses
Occupational Therapists
Physical Therapists
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

- To improve the efficacy of diagnostic imaging for evaluating degenerative joint disease (DJD)
- To increase the use of recommended conservative approach as first-line treatment for degenerative joint disease
- To increase patient education for patients with degenerative joint disease

TARGET POPULATION

Established patients (one who has been seen at his or her primary clinic or medical group at least once) who complain of a painful knee that may be due to degenerative joint disease

INTERVENTIONS AND PRACTICES CONSIDERED

Triage

1. Phone follow-up
2. Schedule provider visits according to urgency criteria
3. Provide patient with education on home self-care
4. Home self-care including rest, ice, compression, elevation, and analgesics (acetaminophen [Tylenol], ibuprofen [Advil, Motrin], aspirin, and naproxen sodium [Aleve])

Diagnosis

1. Differential diagnosis via history, physical examination, laboratory tests, x-rays, joint taps, magnetic resonance imaging (MRI), bone scan, computed tomography (CT), and additional studies, as applicable
2. Laboratory testing including gram stain and bacterial culture, crystal analysis, cell count and differential, synovial fluid, and Lyme test, as applicable
3. Assessments for osteoarthritis as appropriate: iron studies; calcium; phosphorus, and alkaline phosphatase; features of acromegaly; serum and urine homogentistic acid; liver function tests; and diabetes testing
4. Referral to a specialist

Treatment

1. Patient education

2. Pain management with:
    - Joint protection (weight reduction, knee stress avoidance)
    - Physical modalities (cold, heat)
    - Medications (acetaminophen, nonsteroidal anti-inflammatory drugs, COX-2 inhibitors, glucosamine, chondroitin sulfate, and narcotics)
    - Miscellaneous pain relievers (topical creams, electrical stimulation, massage, and acupuncture)
    - Cognitive restructuring, stress management, and relaxation
    - Education regarding basic sleep hygiene measures
3. Exercise including active range of motion, progressive walking, and quadriceps strengthening
4. Assistive devices including a splint, brace, cane, crutch or walker
5. Physical therapy
6. Follow-up including medication changes, injections (intra-articular corticosteroids such as triamcinolone, hyaluronan injection [Synvisc]), exercise, and referral to specialty providers

MAJOR OUTCOMES CONSIDERED

- Diagnosis of degenerative joint disease
- Pain and inflammation rates
- Range of motion
- Patient functioning and safety
- Adverse reactions to treatment

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Key conclusions (as determined by the work group) are supported by a conclusion grading worksheet that summarizes the important studies pertaining to the conclusion. Individual studies are classed according to the system presented

below, and are designated as positive, negative, or neutral to reflect the study quality.

Conclusion Grades:

Grade I: The evidence consists of results from studies of strong design for answering the question addressed. The results are both clinically important and consistent with minor exceptions at most. The results are free of any significant doubts about generalizability, bias, and flaws in research design. Studies with negative results have sufficiently large samples to have adequate statistical power.

Grade II: The evidence consists of results from studies of strong design for answering the question addressed, but there is uncertainty attached to the conclusion because of inconsistencies among the results from the studies or because of minor doubts about generalizability, bias, research design flaws, or adequacy of sample size. Alternatively, the evidence consists solely of results from weaker designs for the question addressed, but the results have been confirmed in separate studies and are consistent with minor exceptions at most.

Grade III: The evidence consists of results from studies of strong design for answering the question addressed, but there is substantial uncertainty attached to the conclusion because of inconsistencies among the results of different studies or because of serious doubts about generalizability, bias, design flaws, or adequacy of sample size. Alternatively, the evidence consists solely of results from a limited number of studies of weak design for answering the question addressed.

Grade Not Assignable: There is no evidence available that directly supports or refutes the conclusion.

Study Quality Designations

The quality of the primary research reports and systematic reviews are designated in the following ways on the conclusion grading worksheets:

Positive: indicates that the report or review has clearly addressed issues of inclusion/exclusion, bias, generalizability, and data collection and analysis.

Negative: indicates that these issues (inclusion/exclusion, bias, generalizability, and data collection and analysis) have not been adequately addressed.

Neutral: indicates that the report or review is neither exceptionally strong nor exceptionally weak.

Not Applicable: indicates that the report is not a primary reference or a systematic review and therefore the quality has not been assessed.

Classes of Research Reports:

A. Primary Reports of New Data Collection:

Class A:

- Randomized, controlled trial

Class B:

- Cohort study

Class C:

- Non-randomized trial with concurrent or historical controls
- Case-control study
- Study of sensitivity and specificity of a diagnostic test
- Population-based descriptive study

Class D:

- Cross-sectional study
- Case series
- Case report

B. Reports that Synthesize or Reflect upon Collections of Primary Reports:

Class M:

- Meta-analysis
- Systematic review
- Decision analysis
- Cost-effectiveness analysis

Class R:

- Consensus statement
- Consensus report
- Narrative review

Class X:

- Medical opinion

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Clinical Validation-Pilot Testing
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Institute Partners: System-Wide Review

The guideline draft, discussion and measurement specification documents undergo thorough review. Written comments are solicited from clinical, measurement, and management experts from within the member medical groups during an eight-week period of "Critical Review."

Each of the Institute's participating medical groups determines its own process for distributing the guideline and obtaining feedback. Clinicians are asked to suggest modifications based on their understanding of the clinical literature coupled with their clinical expertise. Representatives from all departments involved in implementation and measurement review the guideline to determine its operational impact. Measurement specifications for selected measures are developed by the Institute for Clinical Systems Improvement (ICSI) in collaboration with participating medical groups following general implementation of the guideline. The specifications suggest approaches to operationalizing the measure.

Guideline Work Group: Second Draft

Following the completion of the "Critical Review" period, the guideline work group meets 1-2 times to review the input received. The original guideline is revised as necessary and a written response is prepared to address each of the suggestions received from medical groups. Two members of the Committee on Evidence-Based Medicine carefully review the Critical Review input, the work group responses, and the revised draft of the guideline. They report to the entire committee their assessment of two questions: (1) Have the concerns of the medical groups been adequately addressed? (2) Are the medical groups willing and able to implement the guideline? The committee then either approves the guideline for pilot testing as submitted or negotiates changes with the work group representative present at the meeting.

Pilot Test

Medical groups introduce the guideline at pilot sites, providing training to the clinical staff and incorporating it into the organization's scheduling, computer and other practice systems. Evaluation and assessment occurs throughout the pilot test phase, which usually lasts for three months. Comments and suggestions are solicited in the same manner as used during the "Critical Review" phase.

The guideline work group meets to review the pilot sites' experiences and makes the necessary revisions to the guideline; the Committee on Evidence-Based Medicine reviews the revised guideline and approves it for implementation.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The recommendations regarding adult degenerative joint disease (DJD) of the knee are presented in the form of algorithms with 13 components, accompanied by detailed annotations. Algorithms are provided for Diagnosis and Treatment of Adult Degenerative Joint Disease of the Knee - Triage and Diagnosis and Treatment of Adult Degenerative Joint Disease of the Knee; clinical highlights and selected annotations (numbered to correspond with the algorithm) follow.

Class of evidence (A-D, M, R, X) and conclusion grade (I-III, Not Assignable) definitions are repeated at the end of the "Major Recommendations" field.

Clinical Highlights

1. Schedule a same day appointment if a patient reports the following: hot, swollen joint with or without fever (101.5 degrees F or higher) and/or feeling ill, cannot bear weight on leg, leg or foot is cool or blue, deformity, severe pain, locked knee, and/or patient demands to be seen the same day. (Annotation #1c)
2. For patients who are not scheduled for a same day visit, provide advice on basic techniques to reduce pain and inflammation in the knee. These include rest, ice, compression, elevation, and the use of appropriate over-the-counter analgesics. (Annotation #1e)
3. When a patient is diagnosed with DJD of the knee, avoid obtaining an x-ray on the first visit unless specifically indicated. (Annotation #4)
4. Educate the patient regarding overall goals of treatment. These include education regarding the disease and self-management, pain reduction, exercise that promotes joint health, and improvement in patient functioning and safety. (Annotation #8.1)

Diagnosis and Treatment of Adult Degenerative Joint Disease of the Knee - Triage Algorithm Annotations

1c. Does Patient Need to Be Seen Today?

The time frame in which a patient may be seen can be determined by asking a series of triage questions. The questions are intended to determine which symptoms require more urgent treatment by a physician and which ones can be managed through phone advice.

Phone follow-up is one way to ensure that patients keep appointments. These follow-ups can provide additional slots for patient appointments for capitated products. They increase revenue generation for fee-for-service products. Some clinics, however, may not have the staff to support this activity.

The patient should receive an immediate urgent care, emergency department, clinic, provider visit if he or she meets any of the following criteria:

- Hot, swollen joint, with or without fever and/or feeling ill
    - This criterion captures the patient with a possibility of an acute bacterial joint or periarticular infection, either of which would require immediate attention.
- Cannot bear weight on leg
    - This criterion captures the patient with:
        a. atypical bacterial infection
        b. atraumatic fracture
        c. traumatic fracture or derangement
- Leg or foot is cool and/or blue
    - This criterion captures the patient with an acute vascular occlusive event.
- Deformity
    - This criterion captures the patient with a fracture.
- Severe pain
    - This criterion captures the patient with an acute vascular occlusive event.

      Please refer to the National Guideline Clearinghouse (NGC) summary of the Institute for Clinical Systems Improvement (ICSI) guideline Venous Thromboembolism.

- Locked knee (unable to bend or extend)
    - This criterion suggests torn cartilage or a loose body.
- Patient demands to be seen today
    - This criterion captures the patient with other conditions for which immediate attention may be required.

If the patient meets any of the following criteria, a provider should review the triage decision and determine when the patient should be scheduled for a visit:

- Now taking chemotherapy for cancer
    - This criterion requires review of the patient who may be on immunosuppressant medications (and who therefore may not demonstrate typical manifestations of infection).
- Now taking immunosuppressive drugs
    - This criterion requires review of the patient who may be on immunosuppressant medications (and who therefore may not demonstrate typical manifestations of infection).
- History of diabetes
    - This criterion requires review of the patient who may have poor sensation (diabetic neuropathy) and who therefore may not be able to accurately report symptoms of conditions which may require immediate attention.

- Sickle cell anemia
    - This criterion requires review of the patient who may have a sickle cell crisis or acute vascular occlusive event.
- On prednisone
    - This criterion requires review of the patient who may not demonstrate typical manifestations of infection.

1d. Schedule Visit According to Urgency

The patient should receive an appointment within the next 3 days if he or she meets any of the following criteria:

- Unable to go to work or school due to pain
    - The provider will need to appropriately assess disability status.
- Swelling
    - Swelling suggests conditions for which medical care positively affects morbidity (i.e., sprain, strain)

Patients with other types of knee pain should be scheduled for a routine visit.

The patient should be seen at the next available visit for all other types of knee pain.

1e. Provide Appropriate Patient Education

When a patient is scheduled for an appointment within 3 days or several weeks, recommendations for home self-care should be given by the medical information nurse or other appropriate personnel. This pre-appointment education does not take the place of a provider visit, but is only interim advice.

Education should include advice on basic techniques to reduce pain and inflammation in the affected joint. Such techniques include rest, ice, compression, elevation, and the use of appropriate over-the-counter analgesics as follows:

Rest: Reduce or avoid activities that aggravate the pain. Alternate work with rest throughout your day.

Ice: Ice pack applied to the affected joint for 10-15 minutes several times a day. Protect the skin with clothing or a towel.

Compression: If swelling is present, a compression such as Ace™ wrap dressing or sleeve may be used. It should be unwrapped and rewrapped three to four times per day.

Elevation: Elevate the affected extremity above the level of your heart to help reduce swelling.

Analgesics: Recommend acetaminophen (Tylenol™) in standard over-the-counter doses for pain if the patient has no signs of liver disease or excessive intake of alcohol. Over-the-counter anti-inflammatories (NSAIDs) such as ibuprofen (Advil™, Motrin™, etc.), naproxen sodium (Aleve™), or acetylsalicylic

acid (aspirin, Ecotrin™, etc.) may be used if the patient has no history of ulcer disease, diabetes, renal disease, liver disease, or bleeding diathesis; is not currently using anticoagulants such as warfarin (Coumadin®) or heparin, has no sensitivity to these medications, and is not pregnant. Caution should be exercised in recommending chronic NSAID use in persons over age 65 due to the high risk of gastrointestinal (GI) hemorrhage in this population over time.

The following over-the-counter medications may be recommended by the triage person at the clinic. These medications and dosages will provide analgesic and/or anti-inflammatory effects.

- Acetaminophen 500 mg extra strength tablets, 1-2 tablets up to 4 times per day, but do not exceed 8 tablets per day
- Ibuprofen 200 mg tablets, 1-2 tablets up to 4 times per day
- Aspirin 350 mg tablets (enteric coated preferable), 1-2 tablets up to 3 times per day
- Naproxen sodium 220 mg tablets, 1-2 tablets up to 2 times per day

These medications need to be taken on a full stomach and on an as needed basis (PRN). Should a patient choose to take the highest dosage, he or she may achieve an anti-inflammatory effect from ibuprofen, aspirin, or naproxen sodium. Acetaminophen has only analgesic effects.

Since there is no data that one NSAID is more efficacious than another, the use of ibuprofen or naproxen sodium would be most cost effective. It is suggested that NSAID use should be prioritized on the basis of cost.

A patient education brochure or other written information to reinforce home self care instruction may be offered to the patient. This information may be given over the phone, or the patient may be able to pick it up at the clinic if the clinic has the information available in a handout or brochure. Recommended patient education resources are listed in the Support for Implementation section of this guideline.

In certain systems, telephone follow-up may be used to confirm appointments or to allow patients to cancel appointments if home self-care has resolved the initial problem.

Evidence supporting this recommendation is of classes: A, C, D

Diagnosis and Treatment of Adult Degenerative Joint Disease of the Knee Algorithm Annotations

2. Provider Visit

   The provider visit should focus on diagnosis of degenerative joint disease of the knee rather than the differential diagnosis of knee pain.

   History

   1. Age at first sign of painful symptoms. Have you had this pain before? Is it continuous or episodic?

2. How did the pain present? (Sudden onset or slow worsening over time?)
3. How would you classify the pain? (Sharp, dull, pinching, episodic, tight?)
4. How would you rate your average pain over the last month (0-10)?
5. What activity reproduces the pain? What makes it go away?
6. Where is the pain?
7. Are there any associated symptoms? (Locking, swelling, giving way, stiffness)
8. Activity history: What are you doing for exercise? What have you changed about your exercise regimen? What kind of work do you do?
9. Previous treatments/surgery/diagnostic studies.
10. Do you have any chronic medical illnesses? Any allergies?
11. Ask differentiating questions, e.g., does patient have a history of blood clots, psoriasis, gout, liver disease, or a recent deer tick bite?

Physical Examination

Typical physical examination findings in degenerative arthritis of the knee include:

1. Swelling due to effusion with little synovial thickening, usually with little warmth
2. Atrophy of the surrounding muscles
3. Active and passive range of motion may both be restricted
4. Crepitus
5. Pain and muscle spasm at the extremes of existing range of motion
6. Joint deformity

The physical examination may include some or all of the following components as appropriate:

1. Inspection for deformity or abnormalities
2. Check foot pulses
3. Tenderness
4. Presence and location of warmth or erythema
5. Presence and location of swelling or effusion
6. Range of motion, active and passive
7. Assess stability, varus, valgus, anterior drawer, Lachman
8. Meniscal compression (McMurray's test)
9. Crepitus
10. Assessment of patellar function
11. Evaluation of gait

3. History and Physical Examination Indicate DJD?

A history and physical examination may produce a nonspecific result. The practitioner may wish to get laboratory tests, x-rays, or other tests to help diagnose the patient's condition. It is possible that a patient has both DJD and another diagnosis.

In general, the following are consistent with the diagnosis of degenerative joint disease of the knee:

- less than 30 minutes of morning stiffness
- long-standing pain that increases with weight bearing or stairs and lessens with rest
- insidious onset
- bony deformity (osteophyte)
- contracture
- crepitation on movement
- effusions which are not warm as in inflammatory arthritis

The following are inconsistent with DJD of the knee:

- fever or chills
- erythema
- warmth
- large effusions
- locking or giving way

Evidence supporting this recommendation is of class: R

4. Further Diagnostic Testing

If history and physical examination are not conclusive for DJD alone, further diagnostic testing is indicated. For the purposes of this guideline, diagnostic testing includes x-rays, joint taps, magnetic resonance imaging (MRI), bone scan, computed tomography (CT), and laboratory tests.

X-Rays

With a diagnosis of DJD of the knee, avoid obtaining an x-ray on the first visit unless it is specifically indicated. Indications for x-rays in the evaluation of joint pain may include:

- History of trauma to rule out fracture
- Presence of significant effusion - especially monarticular arthritis
- After physical examination, the pain cannot be explained by ligamentous strain or bursitis, and the patient has not had a prior x-ray of that joint done
- Loss of joint range of motion without an established pre-existing condition
- Severe joint pain - even with known pre-existing diagnosis at that joint
- Pre-referral to an orthopedist - if surgery is contemplated
- Persistent significant knee pain, especially in a young patient
- Conservative treatment failed

If the physician chooses to obtain an x-ray, standing anteroposterior (AP) (weight bearing), lateral (possibly weight bearing) and notch view [posteroanterior intracondylar (PAIC)] or tangential patellar are recommended.

Special views such as the posteroanterior intracondylar view may reveal joint space narrowing when the standing anteroposterior view looks normal. The major indication for follow-up x-rays is to identify new pathology or to plan surgery. Follow-up x-rays are not indicated to simply log the progression of the disease. The x-rays should have clinical significance.

When a diagnosis of DJD of the knee is made, computed tomographies, bone scans and magnetic resonance imagings are not recommended.

Indications for laboratory testing in DJD

1. Non-traumatic monarticular effusions with swelling generally require aspiration with the following tests performed on the fluid (if the fluid is not straw colored and clear):
    - Gram stain and bacterial culture
    - Crystal analysis
    - Cell count and differential
    - Not recommended: glucose, protein

    The synovial fluid in osteoarthritis (OA) should be non-inflammatory, i.e., less than 200 white blood cells (wbc)/mm^3, but in a flare could rise to 1,000-2,000 white blood cells/mm^3. Fluid should be clear to only faintly turbid.

    Consider a Lyme test in the presence of monarticular arthritis with joint swelling if the patient gives a history of deer tick bite, erythema chronicum migrans (ECM) rash or possible exposure to ticks.

2. Consider referral or further evaluation for infection, inflammation, neoplastic or toxic etiologies. Lyme serology and synovial fluid analysis are suggested in inflammatory disease.
3. If a patient has osteoarthritis by x-ray that is not due to past trauma or known process and if the patient is younger than 50, the following may be considered:
    - Iron studies (Fe/TIBC) - less than 75 percent saturation and/or ferritin greater than 300 to rule out hemochromatosis.
    - Calcium, phosphorus and alkaline phosphatase to evaluate for hyperparathyroidism.
    - Features of acromegaly: check phosphorus, glucose, consider plasma growth hormone level.
    - Dark urine on standing or black shards in synovial fluid: check serum and urine homogentisic acid.
    - Abnormal liver function tests (LFT): consider Wilson's disease or hemochromatosis.
    - Diabetes may accelerate the osteoarthritis process and elevated blood sugar should raise the question of hemochromatosis or acromegaly in the appropriate clinical setting.

5. Referral to Specialty Providers

When specialty referral is indicated, coordinated management by the primary care provider and a musculoskeletal specialty provider is desirable. On the

initial visit, the provider may reach a diagnosis that requires further evaluation or treatment by a specialty provider. Referral to rheumatologist, orthopedic surgeon, physical medicine and rehabilitation specialist, or another musculoskeletal specialist may be recommended for patients:

1. With a systemic rheumatic disease such as rheumatoid arthritis, systemic lupus erythematosus, scleroderma, vasculitis, inflammatory myopathy, and severe osteoporosis.
2. With functional deterioration due to a rheumatic disease.
3. With septic arthritis or osteomyelitis.
4. With trauma such as a fracture or ligament injury that may require surgery or other treatment that the primary care physician is unable to provide.
5. With a primary or metastatic malignancy.
6. With a laboratory abnormality if uncertainty exists about its interpretation.
7. With chronic musculoskeletal problems who are responding poorly to treatment.
8. Whose function is impaired enough to significantly impact either vocational or avocational interests.
9. Who have fallen or are at risk of falling or who have other safety issues.
10. With a misalignment which might benefit from orthotics.

A patient may not respond after standard therapy options. Consideration may then be given to referral to an arthritis specialist-rheumatologist, physical medicine and rehabilitation specialist, or orthopedic surgeon.

8. Treatment of DJD of the Knee

The overall goals of treatment are to:

1. Provide the patient with an understanding of the disease and self management.
2. Reduce pain.
3. Instruct in exercises to promote joint health.
4. Improve overall patient functioning and safety.

Treatment should include the following components in a progressive fashion over time. A follow-up visit should be scheduled 3-6 weeks after the initial visit.

1. Patient Education

Treatment at the initial visit begins with education. A discussion of the disease and its natural history will allow realistic goals for treatment to be established. The patient should be instructed in methods of proper body mechanics and joint protection. Lifestyle or environment changes should be suggested to eliminate excessive and recurrent trauma. Weight reduction should be recommended for overweight individuals. Moderate exercise should be encouraged. Vigorous activities that produce prolonged pain and inflammation should be avoided. A

healthy, balanced diet with adequate vitamin intake is also recommended.

Some providers may wish to use the patient education outline found in the implementation section of the original guideline document as a checkoff sheet to allow quick documentation of educational components and simultaneously provide the patient with a written summary of recommendations. Other brochures or handouts to reinforce education about the disease, exercise, or medications are listed in the implementation section of the original guideline document under educational resources. An excellent brochure, "Osteoarthritis," is available from the National Institutes of Health (NIH). It is listed in the Support for Implementation section of the original guideline document under "Recommended Education Resources." The provider may wish to consider a referral to education classes for self-management of arthritis. There are some computer-based education programs and several self-help books that may be appropriate. If the patient seems to need more help in problem solving to implement self-care, consider referral to a nurse for medication instruction, physical therapy for exercise instruction, or an occupational therapist for joint protection instruction.

Patient education should, in general, be reinforced with further written or verbal instruction.

2. Pain Management
    a. Joint protection. The patient should be instructed to avoid prolonged standing, kneeling, squatting, and stair climbing.

        If obese, the patient should lose weight through modification of diet and a consistent low impact aerobic conditioning program such as walking 30-60 minutes a day. If a patient with DJD of the knee is unable to walk, consider referral to a physiatrist or physical therapist to assist in identifying appropriate alternative aerobic conditioning exercises.

        If work or home activities seem to aggravate the problem, consider an outside evaluation by an appropriate health care professional.

    b. Physical modalities - see the patient education implementation tool under pain relief using heat and cold.
        1. Cold: ice packs, ice massage. These can be applied every three to four hours as needed for 15-20 minutes at a time.
        2. Heat: warm bath or shower for 15-20 minutes, heat lamp, heating pad, warm compresses.
    c. Medications

        The patient may be started on a course of acetaminophen or, if not effective, a nonsteroidal anti-inflammatory drug (NSAID) in appropriate analgesic doses if there are no contraindications to

those medications. Since there is no proven efficacy of one NSAID over another, unless the patient has a history of peptic ulcer disease or is on anticoagulants, a less expensive one should be tried initially. A cyclooxygenase-2 (COX-2) inhibitor may be preferred for patients over age 65, those with a history of dyspepsia while taking COX-1-NSAIDs, or those with increased risk factors for gastrointestinal hemorrhage.

The nutraceutical agents glucosamine (1500 mg qD) and chondroitin sulfate (1200 mg qD) are widely available and tried by patients. A systematic quality assessment and meta-analysis of double-blind, placebo-controlled trials that tested glucosamine or chondroitin for hip or knee osteoarthritis concluded that some degree of efficacy appears probable for these preparations. It is reasonable to recommend a 60-day trial of the combination of glucosamine and chondroitin sulfate, leaving the decision for ongoing (continuing) therapy to patients on an individual basis.

Narcotic medications are not advised as first-line treatment. Carefully monitored narcotic dosing may be considered for patients who are intolerant of NSAIDs and have not received sufficient benefit from physical therapy (PT), occupational therapy (OT) and other modalities. Dosing should begin in a progressive fashion. Systemic administration of adrenocorticosteroids is of no value. The American College of Rheumatology advocates the use of nonpharmacologic methods first and addition of medication only when additional analgesia is necessary.

Evidence supporting this recommendation is of classes: A, C, R, M

d. Miscellaneous pain relievers

When heat, cold, or medications are contraindicated or ineffective, the following may also be considered:

1. Topical creams such as those containing capsaicin
2. Electrical stimulation such as transcutaneous electrical nerve stimulation (TENS)
3. Massage
4. Acupuncture

e. Cognitive restructuring, stress management, relaxation

These are covered in pain management classes and support groups, the Arthritis Self-Help Course, and stress management classes. Consider referral to one of these classes if they are available.

f. Ensure adequate restorative sleep

Provide instruction in basic sleep hygiene measures (see patient education handout in the implementation section of the original guideline document). Assess causes of non-restorative sleep (pain, nocturia, depression, psychosocial stress, poor sleep hygiene, sleep disorder, congestive heart failure [CHF], etc.) and treat appropriately (relaxation before bed, instruct in use of sleep hygiene, amitriptyline, etc.)

3. Exercise

Exercise should include the following:

a. Active range of motion for the hip, knee and ankle for maintaining and regaining range of motion and for promoting joint health and nutrition.
b. Progressive walking. Begin walking for a duration that is well tolerated as a baseline such that it does not produce accelerating knee pain over successive days. Gradually increase the walk duration to a goal of 30-60 minutes five to seven days per week for closed chain strengthening and endurance training of the legs and for management of obesity. It may also contribute to a sense of well-being and pain control. If the patient has limited tolerance for walking, they may prefer to start by walking in a pool, pushing a shopping cart, using an exercise bike, or other exercise equipment. Many patients do not have access to a pool or exercise equipment, however.
c. Quad sets with VMO (vastus medialis oblique) activation at 15 degrees flexion to full knee extension in external hip rotation.

If the patient has difficulty walking, has contractures, has severe exercise intolerance, has fallen, or has other reasons for being unable to carry out this exercise program, consider referral to a physiatrist or physical therapist (PT) for a supervised program 2 or 3 times a week until the patient can perform an independent exercise program. A physical therapist may focus on the use of other modalities and more specific exercises to regain range of motion, strengthen the lower extremities, and improve endurance. If there is severe loss of function, a physiatrist may be helpful in supervising treatment for complex loss of function.

Exercise should be recommended for patients with DJD of the knee.

[Conclusion Grade I: See Discussion Appendix A, Conclusion Grading Worksheet Annotation #8.3 (Exercise Recommended), in the original guideline document.]

4. Assistive Devices

In some cases an assistive device such as a splint, brace, cane, crutch or walker may be an appropriate component of initial treatment.

Although anyone with appropriate training may instruct in the use of assistive devices, it may be most efficient to refer to a PT, OT, ergonomist, or other professional who is trained to select and instruct in the use of these devices. A physical therapist can teach most patients to use a knee sleeve, cane or walker in 1-2 visits. Other assistive devices such as reachers, bath benches, raised toilet seats, grab bars, etc. may be suggested by an OT, sometimes in a visit to the home, where other safety issues may also be addressed. In the workplace, an OT, PT, or ergonomist may suggest modifications. Sport-specific trainers may provide the best advice regarding athletic activities.

5. Physical Therapy

   Some patients may benefit from a supervised exercise program or from specific therapeutic modalities the therapist can provide.

9. Follow-Up Provider Visits

The response to initial treatment should be assessed at follow-up visits. If the patient is responding well to initial treatment, key points of the treatment plan should be reviewed and reinforced and the following pain rating question should be repeated: How would you rate your average pain over the past month (0-10)? If the patient has had little improvement in symptoms or function or has had complications the provider may consider progressive and/or escalated use of the approaches in Annotation #8.

1. Medication Change
   - A. Trial of a different anti-inflammatory medication. (Patient should be kept on medication for 2 to 4 weeks before trying a different one.)
   - B. Injections
     1. Local intra-articular corticosteroid injections may provide short-term or long-term relief of pain and may be appropriate at this point for some patients. A suggested dose is 40 mg triamcinolone.
     2. A series of injections of hyaluronan preparation (Synvisc®) may also be appropriate to relieve pain at this point in some patients.

        While corticosteroids require a single injection, hyaluronan is given in a series of injections - generally 3-5.

        Synthetic hyaluronates may be effective treatment for pain in selected patients with mild to moderate DJD of the knee. [Conclusion Grade II: See Discussion Appendix B Conclusion Grading Worksheet Annotation #9.1 (Synthetic Hyaluronates), in the original guideline document.]

2. Exercise

The issue of exercise should be readdressed comprehensively at this time. Exercise may include a plan given through instruction at the clinic or a program supervised by a PT, athletic trainer, or other comparable professional.

3. Referral to Specialty Providers

   A patient may not respond after standard therapy options. Consideration may then be given to referral to an arthritis specialist - Rheumatology, Physical Medicine and Rehabilitation, or Orthopedic Surgery. (See Annotation #5, "Referral to Specialty Providers.")

Definitions:

Conclusion Grades:

Grade I: The evidence consists of results from studies of strong design for answering the question addressed. The results are both clinically important and consistent with minor exceptions at most. The results are free of any significant doubts about generalizability, bias, and flaws in research design. Studies with negative results have sufficiently large samples to have adequate statistical power.

Grade II: The evidence consists of results from studies of strong design for answering the question addressed, but there is uncertainty attached to the conclusion because of inconsistencies among the results from the studies or because of minor doubts about generalizability, bias, research design flaws, or adequacy of sample size. Alternatively, the evidence consists solely of results from weaker designs for the question addressed, but the results have been confirmed in separate studies and are consistent with minor exceptions at most.

Grade III: The evidence consists of results from studies of strong design for answering the question addressed, but there is substantial uncertainty attached to the conclusion because of inconsistencies among the results of different studies or because of serious doubts about generalizability, bias, design flaws, or adequacy of sample size. Alternatively, the evidence consists solely of results from a limited number of studies of weak design for answering the question addressed.

Grade Not Assignable: There is no evidence available that directly supports or refutes the conclusion.

Classes of Research Reports:

A. Primary Reports of New Data Collection:

   Class A:

   - Randomized, controlled trial

   Class B:

- Cohort study

Class C:

- Non-randomized trial with concurrent or historical controls
- Case-control study
- Study of sensitivity and specificity of a diagnostic test
- Population-based descriptive study

Class D:

- Cross-sectional study
- Case series
- Case report

B. Reports that Synthesize or Reflect upon Collections of Primary Reports:

Class M:

- Meta-analysis
- Systematic review
- Decision analysis
- Cost-effectiveness analysis

Class R:

- Consensus statement
- Consensus report
- Narrative review

Class X:

- Medical opinion

CLINICAL ALGORITHM(S)

Detailed and annotated clinical algorithms are provided for:

- Diagnosis and Treatment of Adult Degenerative Joint Disease of the Knee - Triage
- Diagnosis and Treatment of Adult Degenerative Joint Disease of the Knee

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The guideline contains an annotated bibliography and discussion of the evidence supporting each recommendation. The type of supporting evidence is classified for selected recommendations (see "Major Recommendations").

In addition, key conclusions contained in the Work Group's algorithm are supported by a grading worksheet that summarizes the important studies pertaining to the conclusion. The type and quality of the evidence supporting these key recommendations (i.e., choice among alternative therapeutic approaches) is graded for each study.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Accurate diagnosis of degenerative joint disease of the knee
- Pain and inflammation reduction
- Increased range of motion
- Phone follow-up can help ensure patient appointments, which can increase revenue generation for fee-for-service products
- Education may lead to increased understanding of the disease and self management
- Exercise may promote joint health
- Overall improved patient functioning and safety

POTENTIAL HARMS

- Concerns have been raised about the effects of the chronic use of acetaminophen on renal function and hepatic function (particularly in patients who consume alcohol).
- Analgesics or nonsteroidal anti-inflammatory drugs may change the patient's ability to sleep, work, perform household activities and adult daily living skills as a result of the use of the medication. Equally important are adverse effects such as drowsiness, gastrointestinal upset (or bleeding), and fluid retention.
- Heat and/or ice: Although rare, frostbite and burns can occur, and are occasionally severe, so patients should be advised to avoid these complications. Warm baths or showers can produce significant vasodilation; therefore, the patient should be cautioned about orthostatic symptoms.
- Recent reports have shown that glucosamine may raise blood insulin levels in patients with diabetes.
- Chondroitin sulfate may affect coumadin levels.

Subgroups Most Likely to be Harmed

- Over-the-counter analgesics or nonsteroidal anti-inflammatory drugs have possible side effects in the elderly including gastrointestinal bleeding, renal toxic effects, and central nervous system effects.
- Caution is urged in the chronic use of acetaminophen in patients who consume alcohol.

CONTRAINDICATIONS

CONTRAINDICATIONS

- Nonsteroidal anti-inflammatory drugs are contraindicated in patients on anticoagulants or with a bleeding diathesis.
- Warm baths and showers (15-20 minutes at 100-105 degrees F) may be contraindicated in patients with cardiovascular disease because of the possibility of orthostatic symptoms.
- Ice packs and ice massage are contraindicated in patients at risk of vasospasm or ischemia.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- These clinical guidelines are designed to assist clinicians by providing an analytical framework for the evaluation and treatment of patients, and are not intended either to replace a clinician's judgment or to establish a protocol for all patients with a particular condition. A guideline will rarely establish the only approach to a problem.
- This clinical guideline should not be construed as medical advice or medical opinion related to any specific facts or circumstances. Patients are urged to consult a health care professional regarding their own situation and any specific medical questions they may have.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Once a guideline is approved for general implementation, a medical group can choose to concentrate on the implementation of that guideline. When four or more groups choose the same guideline to implement and they wish to collaborate with others, they may form an action group.

In the action group, each medical group sets specific goals they plan to achieve in improving patient care based on the particular guideline(s). Each medical group shares its experiences and supporting measurement results within the action group. This sharing facilitates a collaborative learning environment. Action group learnings are also documented and shared with interested medical groups within the collaborative.

Currently, action groups may focus on one guideline or a set of guidelines such as hypertension, lipid treatment and tobacco cessation.

Detailed measurement strategies are presented in the original guideline document to help close the gap between clinical practice and the guideline recommendations. Summaries of the measures are provided in the National Quality Measures Clearinghouse (NQMC).

Systems Approaches to Implementation for This Guideline

1. Schedule a same day appointment if a person reports the following: hot, swollen joint with or without fever (101.5 degrees F or higher) and/or feeling

ill, cannot bear weight on leg, leg or foot is cool or blue, deformity, severe pain, locked knee, and/or patient demands to be seen the same day.
2. For patients who are not scheduled for a same day visit, provide advice on basic techniques to reduce pain and inflammation in the knee. These include rest, ice, compression, elevation, and the use of appropriate over-the-counter analgesics.
3. When a patient is diagnosed with DJD of the knee, avoid obtaining an x-ray on the first visit unless specifically indicated.
4. Educate the patient regarding overall goals of treatment. These include education regarding the disease and self-management, pain reduction, exercise that promotes joint health, and improvement in patient functioning and safety.

RELATED NQMC MEASURES

- Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee: percentage of patients diagnosed with DJD with knee x-ray panels that include a standing view of the knee.
- Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee: percentage of patients with DJD with documented education in four comprehensive areas: protecting the joint, exercise, pain relief, healthy living habits.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Institute for Clinical Systems Improvement (ICSI). Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2003 Nov. 43 p. [40 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1996 Jun (revised 2003 Nov)

GUIDELINE DEVELOPER(S)

Institute for Clinical Systems Improvement - Private Nonprofit Organization

GUIDELINE DEVELOPER COMMENT

Organizations participating in the Institute for Clinical Systems Improvement (ICSI): Affiliated Community Medical Centers, Allina Medical Clinic, Altru Health System, Aspen Medical Group, Avera Health, CentraCare, Columbia Park Medical Group, Community-University Health Care Center, Dakota Clinic, ENT SpecialtyCare, Fairview Health Services, Family HealthServices Minnesota, Family Practice Medical Center, Gateway Family Health Clinic, Gillette Children's Specialty Healthcare, Grand Itasca Clinic and Hospital, Hamm Clinic, HealthEast Care System, HealthPartners Central Minnesota Clinics, HealthPartners Medical Group and Clinics, Hennepin Faculty Associates, Hutchinson Area Health Care, Hutchinson Medical Center, Lakeview Clinic, Mayo Clinic, Mercy Hospital and Health Care Center, MeritCare, Minnesota Gastroenterology, Montevideo Clinic, North Clinic, North Memorial Health Care, North Suburban Family Physicians, NorthPoint Health &: Wellness Center, Northwest Family Physicians, Olmsted Medical Center, Park Nicollet Health Services, Quello Clinic, Ridgeview Medical Center, River Falls Medical Clinic, St. Mary's/Duluth Clinic Health System, St. Paul Heart Clinic, Sioux Valley Hospitals and Health System, Southside Community Health Services, Stillwater Medical Group, SuperiorHealth Medical Group, University of Minnesota Physicians, Winona Clinic, Winona Health

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GUIDELINE COMMITTEE

Committee on Evidence-Based Medicine

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

In the interest of full disclosure, ICSI has adopted a policy of revealing relationships work group members have with companies that sell products or services that are relevant to this guideline topic. The reader should not assume that these financial interests will have an adverse impact on the content of the guideline. Readers of the guideline may assume that only work group members listed below have potential conflict of interest to disclose.

No work group members have potential conflicts of interest to disclose.

ICSI's conflict of interest policy and procedures are available for review on ICSI's website at www.icsi.org.

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previously released version: Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee. Bloomington (MN): Institute For Clinical Systems Improvement (ICSI); 2002 May. 42 p.

GUIDELINE AVAILABILITY

Electronic copies: Available from the Institute for Clinical Systems Improvement (ICSI) Web site.

Print copies: Available from ICSI, 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; telephone, (952) 814-7060; fax, (952) 858-9675; Web site: www.icsi.org; e-mail: icsi.info@icsi.org.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Diagnosis and treatment of adult degenerative joint disease (DJD) of the knee. In: ICSI pocket guidelines. April 2003 edition. Bloomington (MN): Institute for Clinical Systems Improvement, 2003 Mar. p. 282-5.

Print copies: Available from ICSI, 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; telephone, (952) 814-7060; fax, (952) 858-9675; Web site: www.icsi.org; e-mail: icsi.info@icsi.org.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on December 4, 2002. The information was verified by the guideline developer on December 24, 2002. This summary was updated by ECRI on July 20, 2004.

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